

## ***Focus. . . SIDS Deaths Decline***

Sudden Infant Death Syndrome (SIDS) is the leading cause of death in infants older than one month and less than one year of age, accounting for 42 percent of post-neonatal deaths among 1990-95 Missouri resident births. But the SIDS rate has fallen by nearly 50 percent within that period.

In June 1992, the American Academy of Pediatrics issued recommendations that healthy infants be placed to sleep in a supine or lateral (back or side down) position in order to reduce the risk of SIDS. There was considerable resistance among physicians to recommend this change from the prone (stomach down) position traditionally favored in the United States (1-2). Among justifications cited by physicians for avoidance of the supine position were the perceived risk of aspiration of stomach contents and concerns about the applicability of findings from other countries to the United States population. In January 1994, in an international conference on SIDS it was made clear that the early observed reductions in SIDS associated with a change in sleep position had been sustained and that increased supine prevalence has not been associated with any harmful consequences (3). The supine position is now more widely accepted. Survey data show a nationwide decrease of prone sleep position from 73 percent in 1992 to 29 percent in 1995 (4).

A Missouri development that may have had an impact on reported SIDS rates was enactment of legislation, implemented in January 1992, mandating autopsies, death scene investigations, and multi-disciplinary (e.g., physician, law enforcement, and social services) child fatality review team investigation of all sudden, unexplained child deaths. Because SIDS is a diagnosis of exclusion, the implementation of these measures in Missouri had the potential for causing a number of infant deaths which might previously have been classified as SIDS to be assigned other causes of death, e.g., previously undiagnosed diseases, accidental suffocation, or homicide.

We studied SIDS deaths among 1990-95 Missouri resident births. The data for 1995 births are provisional, but because 96 percent of SIDS deaths among 1990-94 births occurred within the first six months of life, we believe the data are nearly complete. Because the data are classified by year of birth rather than year of death, the statistics differ from those in other published reports (including the Missouri Child Fatality Review Program Annual Report).

SIDS deaths and rates per 1,000 births by year of birth and race are presented in Table 1. From 1990 to 1995 Missouri SIDS deaths fell from 132 to 67 and the rate fell by 47 percent, from 1.7 to 0.9 per 1,000 live births. SIDS rates fell earlier and more steeply among blacks. In 1990, blacks were 2.7 times as likely to have a SIDS death than non-blacks, while the gap for 1995 narrowed to 1.3.

The extent to which the decrease in reported SIDS cases represents fewer lost lives rather than only a reclassification of deaths cannot be precisely quantified. The percent of reported SIDS cases that were autopsied are presented in Table

1. Prior to 1992, although not all SIDS cases were autopsied, the autopsy rate was still very high, particularly among black SIDS deaths.

Figure 1 shows overall death rates and death rates due to SIDS and all other causes for infants one to six months of age, the age range in which 90 percent of SIDS deaths occur. The overall rate and the rate of deaths due to causes other than SIDS also fell during this time period. We also examined other subcategories such as homicide and other injuries, without finding major increases that suggest an important trend toward reclassification of deaths. Thus it seems that most of the decrease in SIDS truly reflects fewer lost lives.

We examined the incidence of SIDS among 1990-95 births by selected risk factors for which data are available (sleep position was not available). Through multiple logistic regression we obtained the adjusted relative risk (ARR) and 95 percent confidence interval (CI) for the risk of SIDS for a given risk factor, after adjusting for birth year and the other risk factors in the logistic regression model. These data are presented in Table 2.

Table 2 shows that within the 1990-95 time period, a 1.13 ARR for black births was observed (or 20 percent higher risk than for non-blacks), but because the CI includes 1.00, the increased risk is not statistically significant. Low birth weight (less than 2,500 grams) was associated with a 2.10 ARR, or twice that of normal-weight births, and male births with an

ARR of 1.88 for 1990-95 births. These three variables have been shown elsewhere to be important risk factors for SIDS (5).

Maternal smoking in pregnancy was associated with a 2.31 ARR for SIDS. Both smoking in pregnancy and exposure to cigarette smoke after birth have been identified elsewhere as major risk factors for SIDS (6). Also high is the 1.94 ARR for infants of teen mothers.

The risk of SIDS increases with increased birth order. Second and third births have an ARR of 2.50 in comparison with first births; for fourth- and higher-order births the ARR is 3.19. Smaller but statistically significant ARRs were observed for other risk factors: 1.33 for maternal education less than 12 years; 1.27 for infants of women receiving late prenatal care (after the fourth month of pregnancy) or no prenatal care; and 1.52 for infants of unmarried mothers. Each of these variables is associated with low socioeconomic status, shown elsewhere to be a risk factor for SIDS. They may, however, have other unidentified associations with increased SIDS risk. Non-metropolitan residence was not found to be a significant risk factor for SIDS.

Which groups benefited most from the decrease in SIDS rates between 1990 and 1995? We examined SIDS rates for 1990-91, 1992-93, and 1994-95 births by the presence or absence of risk factors previously discussed. The number and rate of SIDS deaths for each time period are presented in Table 3, along with the percentage that the SIDS rate decreased for 1994-95 births in relation to 1990-91 rates. Because of the relatively small number of SIDS deaths, only unadjusted rates could be developed.

As previously discussed, SIDS rates decreased much more rapidly for blacks than for non-blacks. The 56 percent decrease in SIDS among blacks for 1994-95 from 1990-91 was the greatest decrease observed among all subcategories studied. The 51 percent decrease among male infants was also dramatic, especially in comparison with the 19 percent, statistically insignificant, decrease for females. The 1994-95 data indicate that these historically important risk factors for SIDS may be becoming less important, but because of the small number of SIDS deaths, we cannot make that determination until more data become available.

Infants of unmarried mothers had a greater percentage decrease than infants of married mothers (53 vs. 37 percent, respectively). This decrease reflects more than the differing racial make-ups of the two groups; among both blacks and non-blacks, the decrease in rates was higher among births to unmarried mothers.

Although SIDS decreased among low-birth-weight infants, these infants remained especially vulnerable to SIDS. The SIDS rate among low-birth-weight infants decreased 33 percent, less than the 45 percent decrease observed among normal-weight births. Low birth weight was the only risk factor for which the gap in rates between the risk and non-risk groups did not narrow in 1994-95 in comparison with 1990-91.

The SIDS rate associated with infants of mothers who smoked during pregnancy decreased 43 percent, while for infants of non-smokers a decrease of 36 percent was observed. Smoking in pregnancy decreased from 24.5 percent in 1990-91 to 20.4 percent in 1994-95. This resulted in SIDS deaths for 1994-95 being about 6 percent lower

than would have been expected had smoking rates remained at 1990-91 levels.

SIDS decreased more rapidly among higher-order births (48 and 43 percent for 2nd, 3rd and 4th-plus births, respectively) than among first births (27 percent), and a greater decrease was observed among women with less than 12 years education (45 percent) than among infants of mothers with high school education or more (37 percent). Comparable decreases were observed among infants of teen and non-teens, early and late/no prenatal care recipients, and metropolitan and non-metropolitan residents.

In summary, we have seen sharp decreases in the rate of SIDS among Missouri births, among both high-risk (black, male and low-birth-weight infants, etc.) and low-risk births, and among both low and higher socioeconomic groups. Avoidance of prone sleep position is probably the most important factor in the decrease, but reductions in smoking also have contributed to the decrease in SIDS. Some of the decrease in SIDS in Missouri may also reflect changes in cause of death recording rather than a true decrease in deaths.

The decrease in the SIDS rate makes it reasonable to assume that the "back to sleep" message has reached many Missouri parents. Yet if Missouri is like the rest of the nation, nearly 30 percent of infants sleep in the prone position and are at increased risk of SIDS. SIDS remains a leading cause of postneonatal death. Enhanced efforts by prenatal and infant care providers to promote supine sleeping and avoidance of pre- and post-natal exposure to tobacco smoke could lead to even lower incidence of SIDS.

#### References:

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3Willinger M, et al. Infant Sleep Position and Risk for Sudden Infant Death Syndrome: Report of Meeting Held January 13 and 14, 1994, National Institutes of Health, Bethesda, MD, Pediatrics, 1994, Vol. 93, pp 814-819.

4Hoffman, H. Personal Communication about a National Institute of Health Telephone Survey, June 1996.

5Lazoff et al. Sudden Infant Death Syndrome-Part I: General Features. Academic Emergency Medicine, 1995, Vol. 2, pp 926-933.

6Schoendorf, KC, et al. Sudden Infant Death Syndrome and Maternal Smoking. Pediatrics, 1992, Vol. 90, pp 905-908.

<b>Table 1</b>  <b>Number and Rate of SIDS Deaths and Percentage Autopsied by Race and Year of Birth:</b>  <b>Missouri Resident Births 1990-95</b>									
	<i>Number of SIDS Deaths</i>			<i>Rate per 1,000 Births</i>			<i>Percent of SIDS Deaths Autopsied</i>		
	<i>Total</i>	<i>Non-Black</i>	<i>Black</i>	<i>Total</i>	<i>Non-Black</i>	<i>Black</i>	<i>Total</i>	<i>Non-Black</i>	<i>Black</i>
1990	132	85	47	1.7	1.3	3.5	86	80	96
1991	144	100	44	1.8	1.5	3.1	94	93	98
1992	109	87	22	1.4	1.4	1.7	100	100	100
1993	110	78	32	1.5	1.3	2.5	100	100	100
1994	80	59	21	1.1	1.0	1.8	100	100	100
1995*	67	55	12	0.9	0.9	1.1	100	100	100
*Data for 1995 births are provisional									

<b>Table 2</b>  <b>Adjusted Relative Risk of SIDS for Selected Characteristics: Missouri Resident Births 1990-1995</b>		
	<i>Adjusted Relative Risk†</i>	<i>95% Confidence Interval</i>
Black	1.13	0.90 - 1.37
Low Birth Weight (<2,500 g)	2.10	1.88 - 2.32
Male	1.88	1.71 - 2.05
Maternal Smoking*	2.31	2.13 - 2.48
Maternal Age <20*	1.95	1.70 - 2.19

2nd-3rd Birth	2.50	2.28 - 2.72
4th+ Birth	3.19	2.89 - 3.48
Maternal education <12 yrs*	1.31	1.12 - 1.51
Late/no prenatal care	1.27	1.05 - 1.47
Unmarried mother*	1.52	1.32 - 1.73
Non-metropolitan residence*	1.02	0.84 - 1.20
† Relative risk after adjusting for birth year and all other variables, in comparison to reference group listed in Table 3, e.g., for blacks, adjusted relative risk in reference to non-blacks; for 2nd-3rd and 4th+ births, adjusted relative risk in reference to first births.		
* Maternal characteristic at birth.		

<b>Table 3</b> <b>Number and Rate of SIDS Deaths by Year of Birth and Selected Characteristics with Percentage Decrease</b> <b>in Rates (1990-91 to 1994-1995): Missouri Resident Births 1990-1995</b>							
	<i>SIDS Deaths by Year of Birth</i>			<i>Rate per 1,000 by Year of Birth</i>			<i>Decrease in Rate (%)</i>
	<i>1990-91</i>	<i>1992-93</i>	<i>1994-95†</i>	<i>1990-91</i>	<i>1992-93</i>	<i>1994-95†</i>	<i>1990-91 to 1994-95</i>
Total	276	219	147	1.8	1.4	1.0	42.6
Non-black	185	165	113	1.4	1.3	0.9	35.4
Black	91	54	34	3.3	2.0	1.5	55.7
Non-LBW*	234	176	119	1.6	1.3	0.9	45.0
LBW*	42	43	27	3.6	3.8	2.4	33.4 NS
Female	87	74	65	1.1	1.0	0.9	18.9 NS
Male	189	145	82	2.4	1.9	1.1	53.5
Non-Smoker**	136	97	85	1.1	0.8	0.7	36.0
Smoker**	139	121	61	3.6	3.5	2.1	43.2
1st Birth	60	49	42	1.0	0.8	0.7	26.5 NS
2nd-3rd Birth	158	128	75	2.0	1.7	1.1	47.5
4th+ Birth	57	42	29	3.5	2.6	2.0	43.3

Age 20+**	212	168	111	1.6	1.3	0.9	43.5
Age<20**	64	51	36	2.8	2.4	1.7	40.0
Early Prenatal Care	207	159	120	1.5	1.2	0.9	40.0
Late/No Care	60	54	24	3.1	3.3	1.9	37.5
12+ Years Education**	151	128	90	1.2	1.1	0.8	37.4
<12 Years Education**	116	85	54	3.5	2.7	1.9	44.9
Married**	133	98	74	1.2	1.0	0.7	37.3
Unmarried**	143	121	72	3.1	2.5	1.5	50.7
Metropolitan Resident**	161	126	83	1.7	1.4	1.0	41.9
Non-Metro Resident**	115	93	64	1.8	1.5	1.0	43.4

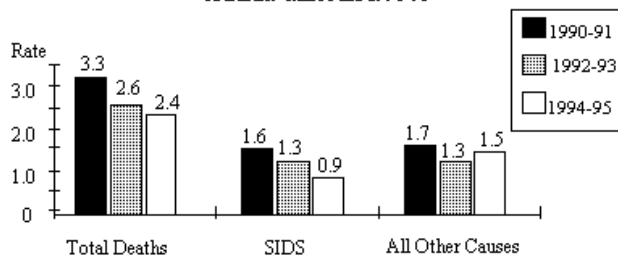
† Data for 1995 births are provisional.

\* LBW: Low Birth Weight (<2,500 grams)

\*\* Maternal characteristic at birth

NS-Decrease in 1994-95 rate from 1990-91 rate is not statistically significant.

**Figure 1**  
**Death Rates per 1,000 Live Births at Age One to Six Months**  
**Among Infants Surviving to One Month of Age by Cause and Year**  
**of Birth: Missouri 1990-95\***



\*Data for 1995 births are provisional

### Provisional Vital Statistics for June 1996

Live Births decreased in June as 6,032 Missouri babies were born compared with 6,246 one year earlier. The birth rate decreased from 14.8 to 13.3 per 1,000 population.

Cumulative births show a slight increase for the first six months of the year, but a decrease for the 12 months ending with June. For the 12 months ending with June, births decreased from 74,644 in 1995 to 73,705.

Deaths decreased in June, but continue to show increases for the 6- and 12-month periods ending with June. For the first half of 1996, deaths increased 2 percent from 27,859 to 28,437.

The natural increase for Missouri in June was 1,933 (6,032 births minus 4,099 deaths). The rate of natural increase in June was 4.3 per 1,000 population.

Marriages increased in June, traditionally the most popular month for weddings, as 6,617 Missouri couples married compared with 5,355 in June 1995.

Dissolutions of marriage increased for all three periods shown below. For the 12 months ending with June, the marriage to divorce ratio dropped to 1.71 compared with 1.75 one year earlier.

Infant deaths decreased for all three periods shown below. For January-June, the infant death rate was 7.5 per 1,000 live births compared with 8.3 in January - June 1995.

## Provisional Resident Vital Statistics for the State of Missouri

	June				Jan.-June cumulative				12 months ending with June				
<u>Item</u>	<u>Number</u>		<u>Rate*</u>		<u>Number</u>		<u>Rate*</u>		<u>Number</u>		<u>Rate*</u>		
	<u>1995</u>	<u>1996</u>	<u>1995</u>	<u>1996</u>	<u>1995</u>	<u>1996</u>	<u>1995</u>	<u>1996</u>	<u>1995</u>	<u>1996</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>
<b>Live Births</b>	6,246	6,032	14.8	13.3	36,494	36,624	13.8	13.8	74,644	73,705	14.6	14.1	13.8
<b>Deaths</b>	4,163	4,099	9.9	9.0	27,859	28,437	10.6	10.7	53,489	54,447	10.3	10.1	10.2
<b>Natural increase</b>	2,083	1,933	5.0	4.3	8,635	8,187	3.3	3.1	21,155	19,258	4.2	4.0	3.6
<b>Marriages</b>	5,355	6,617	12.7	14.6	20,829	21,509	7.9	8.1	45,040	45,737	8.4	8.5	8.6
<b>Dissolutions</b>	2,377	2,514	5.7	5.5	12,874	13,820	4.9	5.2	25,723	26,672	5.1	4.9	5.0
<b>Infant deaths</b>	53	32	8.5	6.1	304	274	8.3	7.5	602	523	7.7	8.1	7.1
<b>Population base (in thousands)</b>	...	...	5,323	5,352	...	...	5,323	5,352	...	...	5,256	5,213	5,338

\*Rates for live births, deaths, natural increase, marriages and dissolutions are computed on the number per 1000 estimated population. The infant death rate is based on the number of infant deaths per 1000 live births. Rates are adjusted to account for varying lengths of monthly reporting periods.

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